



Time - 3 Hour

MM-70

The question paper contains 3 printed pages.

Note:

- a. Kindly attach the question paper with the answer sheet at the time of submission of answer sheet.
- b. All sections are compulsory.
- c. Marks are indicated against each question.

Section A

Q. 1. Kindly tick (✓) against the correct option. (4 x 2marks = 8 marks)

i. Time is an example of data with

- a. Nominal Scale
- b. Ordinal Scale
- c. Interval Scale
- d. Ratio Scale

ii. According to the empirical rule of normal distribution, approximately what percent of the data should lie within $\mu \pm 2\sigma$

- a. 68.26%
- b. 95.45%
- c. 99.7%
- d. 99%

iii. Which of the following is based on all observations of data?

- a. Mean
- b. Median
- c. Mode
- d. None of the above

iv. Probability distributions are useful because:

- a. We know the probability of randomly selecting a score from any region of the distribution
- b. We know the probability of the tails being equal
- c. We know the probability that the peak of the distribution will be in the middle
- d. Probability distributions are not useful

Kindly fill in the blanks for the following (3 x 2marks = 6 marks)

- v. Standard deviation of sampling distribution of any statistic (sample means) is called.....
- vi. The mean of a distribution is 23, the median is 24, and the mode is 25.5. It is most likely that this distribution isskewed.
- vii. The value of Pearson's coefficient of correlation lies between

Kindly write True or False against the statement (3 × 2 marks = 6 marks)

- viii. The paired t-test is appropriate for comparing the means of independent groups of observations.
- ix. For large degrees of freedom, the distribution becomes almost a normal distribution.
- x. A correlation coefficient does not provide evidence of a causal relationship between two variables.

Section B

Define any four from the following (4 x 5 marks= 20 marks)

- a. Use of Biostatistics in pharmaceutical field
- b. Levels of measurement (Types of scale)
- c. Describe mean with its merits and demerits
- d. Two types of errors in hypothesis testing
- e. Normal distribution
- f. Steps followed in testing of hypothesis
- g. Chi-squared test



Section C

Attempt any three from the following questions

1. Suppose the Acme Drug Company develops a new drug, designed to prevent colds. The company states that the drug is equally effective for men and women. To test this claim, they choose a simple random sample of 100 women and 200 men from a population of 100,000 volunteers. At the end of the study, 38% of the women caught a cold; and 51% of the men caught a cold. Based on these findings, can we reject the company's claim that the drug is equally effective for men and women? Use a 0.05 level of significance. (10 marks)

2. An analyst is tasked with measuring the pH of ten samples taken from a batch of liquid product. The average pH (mean) was found to be 6.50 and SD 0.15. Construct 95% and 99% confidence interval estimate for the population mean. (10 marks)
3. The administrator at your local hospital states that on weekends the average wait time for emergency room visits is 10 minutes. Based on discussions you have had with friends who have complained on how long they waited to be seen in the ER over a weekend, you dispute the administrator's claim. You decided to test your hypothesis. Over the course of a few weekends you record the wait time for 40 randomly selected patients. The average wait time for these 40 patients is 11 minutes with a standard deviation of 3 minutes. Do you have enough evidence to support your hypothesis that the average ER wait time exceeds 10 minutes? You opt to conduct the test at a 5% level of significance. (10 marks)
4. A study was conducted to see the association between smoking habit and suffering from lung disease. Data was collected from 105 persons and summarized below:

	Smokers	Nonsmokers
Suffering from lung disease	36	14
Not suffering from lung disease	30	25

Test whether there is an association between smoking habit and suffering from lung disease? Use a 0.05 level of significance. (10 marks)

5. Five tablets were weighed and then assayed with following results:

Weight (mg)	205	200	202	198	197
Potency (mg)	103	100	101	98	98

- a. Find the regression equation of potency on weight. (7 marks)
 b. Predict the potency for a 200-mg tablet (3 marks)

